CLAIMS

1.   Utility for reciprocal polarization with mutually complementary polarizing layers (cross-polarizer), distiguished by

1.1   comprising at least three polarizing layers Pi (i=1,2,3,..), each of said layers possessing a normal vector Ni normal to Pi and a layer vector Vi coplanar to Pi, said Vi together with the optical axes if incidence and reflexion of Pi defining which directions of polarization of the electromagnetic radiation incident on Pi will be reflected (polarizing reflexion) resp. will transmit Pi (polarizing transmission) such that Vi together with the axis of reflexion of Pi span the plane of polarization of the reflected beam and Vi together with the axis of incidence of Pi span a plane, which is perpendicular to the plane of polarization of the transmitting beam,

1.2   polarizing layers P1 and P2 being arranged along a first optical axis A1 such that V1 of P1 together with A1 span a plane E1 that is perpendicular to the plane E2 spanned by V2 of P2 and A1 (designated by the term „mutual complementarity" of P1 and P2),

1.3   polarizing layers P1 and P3 being arranged along a second optical axis A2 such that V1 of P1 together with A2 span a plane E3 that is perpendicular to the plane E4 spanned by V3 of P3 and A2 (designated by the term „mutual complementarity" of P1 and P3),

1.4   optical axes A1 and A2 intersecting in P1, cutting angle between N1 and A1 equalling cutting angle between N1 and A2,

1.5   the polarizing layers being positioned such that in the light path a transmission at P1 being coupled to a reflexion at P2 along the axis A1 and a reflexion at P1 being coupled to a transmission at P3 along the axis A2 are coupled (designated by the term „reciprocal polarization").

2.   Cross-polarizing system according to claim 1,
said polarization layers Pi being cartesian polarizers, characterized by having their polarization planes selectable independently from the plane of incidence,

and said polarization layers Pi being arranged in planes which are perpendicular to a common ground plane, and all said optical axes being coplanar to a common ground plane.

3. Cross-polarizing system according to claim 2,
   said layer vector V1 of P1 and said layer vector V2 of P2 being perpendicular to each other.

4. Cross-polarizing system according to claim 3,
   said polarizing layers P2 and P3 forming a common polarization layer.

5. Cross-polarizer system according to claim 1,
5.1 comprising at least one right prism (with all lateral surfaces perpendicular to its footprint) with a triangular footprint composed of two right prisms (with all lateral surfaces perpendicular to the footprint) T1 and T2 each with an isosceles triangular footprint,
5.2 the lateral surface of subprism T2 inbetween the two subprisms carrying a cartesian polarization layer P1,
5.3 the lateral surface of subprism T1, which with a lateral surface of subprims T2 forms a common lateral surface of the compound prism carrying a cartesian polarization layer P2.

6. Cross-polarizing system according to claim 1,
   containing at least a right prism (with all lateral surfaces perpendicular to its footprint) with an isosceles triangular footprint and the two lateral surfaces of equal size carrying mutually complementary polarizations layers.

7. Cross-polarizing system according to claim 1,
   comprising an additional fourth polarization layer P4 which together with said P2 along a third optical axis A3 and together with said P3 along a fourth optical axis A4 constitutes an additional cross-polarizer according to claim 1.

8. Cross-polarizing system according to claim 7,
polarization layers P1 and P4 having parallel layer vectors and being within a common plane E1, and the polarizaton layers P2 and P3 having parallel layer vectors and being within a common plane E2, and E1 and E2 having an intersection line where all four polarization layers meet.

9. Utility for reciprocal polarization with mutually complementary polarizing layers (cross-polarizer), distiguished by

9.1 comprising two polarizing layers Pi (i=1,2), said layers each possessing a normal vector Ni normal to Pi and a layer vector Vi coplanar to Pi, said Vi together with the optical axis if incidence and reflection of Pi defining which directions of polarization of the electromagnetic radiation incident on Pi will be reflected (polarizing reflexion) resp. will transmit Pi (polarizing transmission) such that Vi together with the axis of reflexion of Pi span the plane of polarization of the reflected beam and Vi together with the axis of incidence of Pi span a plane, which is perpendicular to the plane of polarization of the transmitting beam,

9.2 polarizing layers P1 and P2 being arranged along a first optical path S1, which is folded by n reflecting means (n=1,2,3,...) such that the plane E1, which is spanned by V1 and the optical axis of S1 in P1, and the plane E2, which is spanned by V2 and the optical axis of S1 in P2, have a correlation such that the mirrored plane E1*, which is derived from E1 by successive reflexions at said n reflecting means, is perpendicular to E2 (designated by the term „mutual complementarity" of P1 and P2),

9.3 polarizing layers P1 and P2 being arranged along a second optical path S2, which may be folded by n reflecting means (n=0,1,2,...) such that the plane E3, which is spanned by V1 and the optical axis of S2 in P1, and the plane E4, which is spanned by V2 and the optical axis of S2 in P2, have a correlation such that the mirrored plane E3*, which is derived from E3 by successive reflexions at said n reflecting means, is perpendicular to E4 (designated by the term „mutual complementarity" of P1 and P2),

9.4 said two optical paths S1 and S2 intersecting in P1 with equal cutting angles

between N1 and S1 and between N1 and S2,

9.5 the architecture of the system coupling the transmission at P1 along S1 to a reflexion at P2 and the corresponding reflexion at P1 to a transmission at P2 along S2.

10. Utility for reciprocal polarization with mutually complementary polarizing layers (cross-polarizer), distiguished by

10.1 comprising at least three polarizing layers Pi (i=1,2,3,..), each of said layers possessing a normal vector Ni normal to Pi and a layer vector Vi coplanar to Pi, said Vi together with the optical axes if incidence and reflexion of Pi defining which directions of polarization of the electromagnetic radiation incident on Pi will be reflected (polarizing reflexion) resp. will transmit Pi (polarizing transmission) such that Vi together with the axis of reflexion of Pi span the plane of polarization of the reflected beam and Vi together with the axis of incidence of Pi span a plane, which is perpendicular to the plane of polarization of the transmitting beam,

10.2 polarizing layers P1 and P2 being arranged along a first optical path S1, which is folded by n reflecting means (n=1,2,3,...) such that the plane E1, which is spanned by V1 and the optical axis of S1 in P1, and the plane E2, which is spanned by V2 and the optical axis of S1 in P2, have a correlation such that the mirrored plane E1*, which is derived from E1 by successive reflexions at said n reflecting means, is perpendicular to E2 (designated by the term „mutual complementarity" of P1 and P2),

10.3 polarizing layers P1 and P3 being arranged along a second optical path S2, which may be folded by n reflecting means (n=0,1,2,...) such that the plane E3, which is spanned by V1 and the optical axis of S2 in P1, and the plane E4, which is spanned by V3 and the optical axis of S2 in P3, have a correlation such that the mirrored plane E3*, which is derived from E3 by successive reflexions at said n reflecting means, is perpendicular to E4 (designated by the term „mutual complementarity" of P1 and P3),

10.4 said two optical paths S1 and S2 intersecting in P1 with equal cutting angles between N1 and S1 and between N1 and S2,

10.5 the architecture of the system coupling the transmission at P1 along S1 to a reflexion at P2 and the corresponding reflexion at P1 to a transmission at P3 along S2.

11. Cross-polarizing system according to claim 10,
comprising an additional fourth polarizing layer P4, which together with said P2 along a third optical path S3 and together with said P3 along a fourth optical path S4 constitutes an additional cross-polarizer according to claim 10.

12. Cross-polarizing system according to claim 10,
at least one of said layers Pi being doubled or two-sided cartesian polarizer with parallel layer vectors Vi.

13. Cross-polarizing system according to claim 10,
all of said Pi being cartesian polarizers, e.g. wire grid polarizers.

14. Cross-polarizing system according to claim 10,
all of said Pi being thin-film polarizers working according to Brewster´s law.

15. Cross-polarizing system according to claim 10,
all of said Pi contained in a body and the optical paths in and out of the cross-polarizing system made possible by windows or openings.

16. Utility for the light architecture in a two-channel display system, distinguished by
16.1 comprising at least one cross-polarizing system according to claim 10,
16.2 comprising at least one spatial light modulator in each channel,
16.3 one of said cross-polarizing systems being used to feed the spatial light modulators with polarized light.

17. Utility for the light architecture in a two-channel display system, distinguished by

17.1 comprising at least one cross-polarizing system according to claim 10,

17.2 comprising at least one spatial light modulator in each channel,

17.3 one of said cross-polarizing systems being used to superpose the modulated light from the spatial light modulators.

18. Utility for the light architecture in a two-channel display system, distinguished by

18.1 comprising a cross-polarizing system according to claim 10,

18.2 comprising at least one spatial light modulator of the type micro-electro-mechanical-system (MEMS, e.g. DMD by Texas Instruments) in each channel,

18.3 said cross-polarizing system being used to both feed the spatial light modulators with polarized light and to superpose the modulated light from the spatial light modulators,

18.4 the plane of incidence in said P1 intersecting the plane of superposition with an angle different from 0deg.

19. Utility for the light architecture in a two-channel display system, distinguished by

19.1 comprising a cross-polarizing system according to claim 9,

19.2 comprising at least one spatial light modulator in each channel positioned in said optical paths S1 and S2 between P1 and P2.

20. Utility for the light architecture in a two-channel display system, distinguished by

20.1 comprising a cross-polarizing system according to claim 15,

20.1 comprising at least one spatial light modulator in each channel which is mounted to the body.

21. Cross-polarizing system according to claim 1,
comprising at least one right prism (where the lateral surfaces are perpendicular to the footprint) with the footprint of a triangle, which is composed of two right sub-prisms with the footprint of an isosceles triangle

each, such that a thin-film type polarizing layer P1 is situated between these two sub-prisms, and the lateral surface of the compound prism that consists of two lateral surfaces of the sub-prisms, carries a cartesian polarizing layer P2 with the layer vector V2 perpendicular to V1.

22. Cross-polarizing system according to claim 1,
comprising at least one right prism (where the lateral surfaces are perpendicular to the footprint) with the footprint of a triangle, which is composed of two right sub-prisms with the footprint of an isosceles triangle each, such that a cartesian type polarizing layer P1 is situated between these two sub-prisms, and the lateral surface of the compound prism that consists of two lateral surfaces of the sub-prisms, carries a cartesian polarizing layer P2 with the layer vector V2 perpendicular to V1.

23. Cross-polarizing system according to claim 1,
comprising at least one right prism (where the lateral surfaces are perpendicular to the footprint) with the footprint of a triangle, which is composed of two right sub-prisms T1a,T1b with the footprint of an isosceles triangle each, such that those lateral surfaces of the compound prism, that consists of only one lateral surface of the sub-prisms, carries polarization layers P1 and P2.

24. Cross-polarizing system according to claim 1,
made of at least one right prism (where the lateral surfaces are perpendicular to the footprint) with the footprint of a triangle, which is composed of two right sub-prisms with the footprint of an isosceles triangle each, such that a thin-film type polarizing layer P1 is situated between these two sub-prisms.

25. Cross-polarizing system according to claim 10,
all cartesian polarizing layers being doubled or two-sided.